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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/538,984	06/14/2005	Timothy Daniel Shaffer	2003B133	7501

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EXAMINER
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TESKIN, FRED M

ART UNIT	PAPER NUMBER
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1713

DATE MAILED: 06/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/538,984

Applicant(s)

SHAFFER ET AL.

Examiner

Fred M. Teskin

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-69 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-22, 27-29, 34, 36-41, 43-59, 61-64 and 66-69 is/are rejected.
- 7) ☒ Claim(s) 23-26, 30-33, 35, 42, 60 and 65 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 061405
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_

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The preliminary amendment of June 14, 2005 having been entered, claims 1-69 are currently pending and under examination.

The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: the lack of proper antecedent basis for the subject matter of the phrase "particles of polymer are polymerized" as recited in claims 52 and 62.

Claim 65 is objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim should refer to other claims in the alternative only. Claim 65 currently refers to two sets of claims to different features, i.e., the polymerization medium of claim 64 *and* the HFC's as defined in any of claims 1 to 49 or 54 to 61. See MPEP § 608.01(n). Accordingly, claim 65 has not been further treated on the merits.

Claims 12, 13, 63 and 66-69 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the

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subject matter which applicant regards as the invention. More specifically, the following grounds for indefiniteness apply to the indicated claims.

(A) Claim 12 is confusing and technically inaccurate in defining "hydrocarbon" as a "halogenated hydrocarbon ...". A "hydrocarbon", by customary definition, is a compound consisting of C and H atoms –i.e., it is not generic to halogenated analogues.

(B) Regarding claims 63 and 66, the expression "obtainable by the process of claim 1" renders claims 63 and 66-69 indefinite because almost any variation in any parameter within the scope of the claimed process would alter the polymer produced. In consequence, one who made or used a polymer made by a process other than the process recited in the parent claim would have to produce polymers using all possible parameters within the scope of claim 1 – a practical impossibility – and then extensively analyze each product to determine if his polymer was obtainable by a process within the claimed process. A claim is indefinite if undue experimentation is involved to determine the boundaries of protection. *Ex parte Tanksley*, 26 USPQ2d 1389. This rationale is applicable to the present case in view of the extensive testing that would be involved in ascertaining whether a polymer made by a process different to that claimed is nevertheless obtainable by the claimed process.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-13, 19, 27-29, 34, 36, 39-41, 43-57, 61-64 and 66-69 are rejected under 35 U.S.C. 102(b) as anticipated by, or in the alternative, under 35 U.S.C. 103(a) as obvious over US 2548415 to Welch et al.

The invention, as defined in claim 1, is a polymerization process comprising contacting one or more monomer(s), one or more Lewis acid(s), one or more initiator(s), and a diluent comprising one or more hydrofluorocarbon(s) (HFC's) in a reactor.

Welch et al disclose a polymerization process wherein isoolefin and diolefin are copolymerized in a fluoro-substituted hydrocarbon diluent in a reactor. See Example I and Run Nos. 1-5 in Tables I and Ia: the monomers are contacted with  $\text{BF}_3$  catalyst and ethylidene fluoride as feed diluent and/or catalyst solvent. In Run No. 1, the ethylidene fluoride solution is used with methyl chloride diluted reactants. Ethylidene fluoride, or 1,1-difluoroethane, is a species of HFC's within claims 1/6, 7, 48, 62 and 64; methyl chloride an alkyl halide initiator within claims 1/11-13, 29, 48, 62 and 64; and  $\text{BF}_3$  a species of Lewis acid within claims 1/14, 19, 27, 28, and 64. Furthermore, ethylidene fluoride inherently possesses a dielectric constant within the ranges of claims 39-41 and 54-57, as evidenced by the  $\epsilon$  value reported for 1,1-difluoroethane on page 51 of the Specification.

Accordingly, Welch et al is seen to disclose a polymerization process comprising the step of contacting species of the applicants' monomer, Lewis acid, initiator and diluent in a reactor, as claimed.

Regarding claims 43-47, Welch et al (i) state that their fluorine substituted compound has a "very low solubility for and in olefinic polymers of molecular weights above 20,000" (col. 4, ll. 65-75) and that the "low solubility of the polymer in the diluent greatly reduces the tendency toward precipitation of polymer on the cold reactor walls" (col. 5, ll. 70+); and (ii) report values as low as 0.0014 g polymer/100 cc solvent for solubility in ethylidene fluoride of the polymers from the runs of Example 3 (col. 11, Table IV). In light of these disclosures and given the identity of polymerization system - i.e., monomer(s), Lewis acid(s), initiator(s) and diluent as noted above - a plausible

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basis exists for inferring that the polymer product of Welch et al, e.g., Run No. 1, will inevitably possess the undisclosed parameter of diluent mass uptake.

Regarding claim 38, it would have been obvious to undertake the Welch et al process in the requisite reactor, e.g., continuous stirred tank or tubular reactor, given the reference's exemplified use of a *continuous* type reactor and its teaching of introducing the catalyst solution in various ways, as by application of to the surface of the *rapidly stirred* olefin-halogenated diluent mixture (col. 5, ll. 35-40 and Example 3).

Claims 1-22, 27, 28, 34, 36-38 and 48-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5728783 to Falchi et al.

Falchi et al disclose a polymerization process, comprising the step of contacting alpha-olefin with a defined quantity of solvent and a primary transition metal catalyst in combination with a Lewis acid cocatalyst (see, cols. 4-8 and Examples).

The reference differs from the claimed invention essentially in that the combination of a diluent comprising HFC's, a primary transition metal catalyst and a Lewis acid cocatalyst is not disclosed in a single embodiment.

Nevertheless, the reference does recommend hydrofluorocarbon solvent as a polymerization medium (col. 5, ll. 14+); and although specific hydrofluorocarbons are not mentioned, those of ordinary skill are presumptively aware of at least the simplest hydrofluorocarbon solvents available commercially. Given both the specific suggestion in Falchi et al to use a HFC solvent and the high level of skill in the polymerization art, it would have been obvious to an ordinarily skilled practitioner to carry out the reference

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process employing a known HFC solvent in lieu of an aliphatic hydrocarbon, and thereby arrive at the present invention.

Claim 1-22, 27, 28, 34, 36-41, 48-59, 61-64 and 66-69 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 3470143 to Schrage et al.

The Schrage et al reference discloses a particle form polymerization process wherein highly fluorinated hydrocarbons are used as diluents.

The reference differs from the claimed invention essentially in the use of a perfluorinated diluent, rather than one comprising a hydrofluorocarbon (HFC): see the working examples, particularly Example 4, which details the preparation of polypropylene-butene-1 block copolymer by adding a solution of 1-butene in octafluorocyclobutane to a polypropylene reaction product and column 1, lines 31-35 where the patentees' basic invention is said to relate to an innovation in slurry or *particle form* polymer reactions involving ethylenically unsaturated monomers.

The reference, however, plainly teaches the alternativeness among various species of fluorocarbons, see column 4, lines 33+, where specific HFC's are equated with specific perfluorinated hydrocarbons as examples of acyclic and alicyclic fluorocarbons applicable to the disclosed process. Given an expectation of equivalent performance as diluent, one of ordinary skill would have been inclined to substitute an HFC such as difluoromethane - one of the simplest fluorocarbons mentioned in Schrage et al (col. 4, line 35) - for octafluorocyclobutane in any of the exemplified embodiments. The result would be a process within the scope of the rejected claims, including claims



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39-41 and 54-59, inasmuch as difluoromethane is known to intrinsically possess a dielectric constant within the claimed ranges, as evidenced by the  $\epsilon$  value reported for this HFC on page 51 of the Specification.

Claims 63 and 66-69 are rejected under 35 U.S.C. 102(b) as anticipated by, or in the alternative, under 35 U.S.C. 103(a) as obvious over WO 00/04061.

WO '061 discloses polymer products of isobutylene, which are homo- or co-polymers meeting the positive limitations of claims 67-69 as to Mw and which are produced by use of a specific cationic catalyst system; see Examples 1-4 and Table 1 on pages 20-21.

While the type of diluent used in the process of claim 1 is not disclosed in WO '061, the rejected claims are drawn to the ultimate composition or polymer product, not its method of preparation.

Accordingly, given the breadth of polymers made by the recited methods and the lack of any basis to find that polymers throughout such breadth would be substantively unique on the basis of their method of manufacture, the polymers exemplified in WO '061 are seen to fall within the scope of claims 63 and 66-69, and therefore these claims are unpatentable.

Where, as here, a product-by-process claim is rejected over a prior art product that appears to be identical, although produced by a different process, the burden properly shifts to applicants to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product. In re Marosi, 218

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USPQ 195 (Fed. Cir. 1983). This is especially true given the lesser burden of proof on the Office in making out a case of *prima facie* obviousness for product-by-process claims, because of their peculiar nature (M.P.E.P. 2113).


Claims 23-26, 30-33, 35, 42 and 60 are objected to as being dependent on a rejected base claim but would be allowable if rewritten in independent form including all the limitations of the base claim and any intervening claim. The features of these dependent claims, particularly regarding species of Lewis acid and initiator, inclusion of defined quantity of water and dielectric constant of diluent, are not taught nor fairly suggested in the available prior art.

Any inquiry concerning this communication should be directed to Examiner F. M. Teskin whose telephone number is (571) 272-1116. The examiner can normally be reached on Monday through Thursday from 7:00 AM - 4:30 PM, and can also be reached on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached on (571) 272-1114. The appropriate fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

FMTeskin/06-06-06

  
**FRED TESKIN**  
**PRIMARY EXAMINER**  
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